

Australian Plants

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Colour Photography By Frank Hurley

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CRIMSON BOTTLE BRUSH

(*Callistemon citrinus* syn. *Callistemon lanceolatus*)

A fine ornamental shrub reaching a height of 10 feet if not well pruned.

HOW TO GROW BOTTLE BRUSHES

By J. L. ABEL, Native Plant Nurseryman Nowra, N.S.W.

The Callistemons (pronounced Cal-lis-temon), commonly called bottle-brushes, can be classed among some of our best flowering shrubs and trees. In the bush they are usually found where there are ample supplies of moisture but in the garden can adapt themselves to any type of soil. This makes them wonderful garden subjects requiring no special attention. They

prefer a place with a good depth of soil, ample supplies of water and protection from the worst winds. They are used as ornamental hedges, those commonly available being listed below. For a well shaped shrub and plenty of blooms, pruning must take place directly after flowering each year. Cut well back to old wood removing all seed capsules. A shrub cannot produce good blooms and seed at the same time. Where each branch is cut back, a number of new shoots will emerge giving in the next season three flower heads where there was previously one. There is always a good crop of blooms on the shrubs in the bush after bushfires, because of the heavy growth of young shoots and the increased mineral content in the soil from the timber ash. *Callistemons* respond well to manures and fertilisers which can be applied without fear of damage to the plant. Mulching by lawn cuttings or leaf mould, particularly in the spring, is recommended, it keeping the roots cool and preserving moisture. Liberal watering is appreciated but owing to their deep rooting system they can stand up to long dry spells without attention.

The plants may be propagated from cuttings or by the Marcotage (air laying) technique, but the easiest method is by germination from seed. I use the immersion method described by Mr. H. Boyd. However, seedlings may not have identical characteristics to the parent plant due to cross pollination by insects, and many different shades of blooms may come out of each sowing. When collecting *Callistemon* seed, the capsules chosen for breaking off the main stem must be at least two or three years old.

CALLISTEMONS SUITABLE FOR ORNAMENTAL SHRUBS

There are many species available with colours from white to yellow, red and violet. The height varies from three feet to large trees. The native plant nurseryman can recommend the one to suit your position with a quality of bloom required. A few of the more readily available species are listed below.

Callistemon salignus red form—height 15ft. Foliage commences at ground level. New foliage produces lovely red tips. The blooms are red dusted with gold darkening up to almost violet as the bloom ages.

C. macropunctatus (syn. *C. rugulosus*, syn. *C. coccineus*) — Height 5-8ft. Red tipped foliage with scarlet blooms.

C. citrinus (syn. *C. lanceolatus*) — height 10ft. Flowers red with good foliage.

C. lilacinus (incorrectly known as *C. violaceus*)—tall dense growing shrub to 12ft. with small brushes of a violet shade.

C. speciosus—Native of the Albany district of W. Australia where the average rainfall is 35 inches. Dark green foliage to a height of 10ft. with large red brushes.

C. linearis—A species of 6ft. with large pale red brushes.

C. linearis var. *pumila*—height 2ft. Flowers of large red brushes, foliage dark green.

C. pinifolius—A tall spindly shrub to height of 20ft. with flowers of yellowish red.

CALLISTEMONS SUITABLE FOR HEDGES OR WIND BREAKS

I consider *Callistemon salignus* red form the best variety for a tall hedge as it has a dense growing habit from ground level to a height of 15ft. if desired. Other species which are suitable to about 8ft. but require a lot more pruning to shape are *C. citrinus* also listed above, *C. linearifolius* with large red brushes or *C. viminalis*, the weeping bottlebrush for large hedges of about 20ft.

The Treatment of Seed

—Under Wet Conditions

By H. BOYD

The seed of *Callistemon*, *Melaleuca*, *Leptospermum* and *Tristania* are contained in capsules and in most of the species retained on the plant for many years. They are not dissipated until after the plant meets adversity such as injury, drought or bushfire. Dehydration and shrinkage, sometimes caused by the plant itself forming an abscission layer (cutting off the supply of sap to the capsule), eventually causes the valves in the seed capsules to open. The collection of this seed sometimes puzzles people, but it is not difficult. If capsules that are on the older wood—this is very obvious on *Callistemon* as they are the lowest on the plant—are placed in a paper bag and the bag placed in a warm dry position, the seed contained in the capsules will, in a period of from 10 days to three weeks, be found in the bottom of the bag.

A simple method for the germination of this seed is to treat them as bog plants. Take a well crocked pot almost filled with rich bush soil, wet and tamp down making sure the surface is level. Sow the fine seed sparsely from the point of a knife, and in the same manner distribute over it a very light covering of sand. The pot is now immersed in a non-ferrous container to a depth of about two-thirds its height in water or until the surface is wet but not inundated. The water level of the outer container might have to be experimented with. The outer container must not be of iron as rust in strong concentration is poisonous to seedlings. Aluminium ice cream trays can be used. The tray that is to contain the soil has holes punched in the bottom and another tray can be manipulated to act as the outer container for the water.

A piece of glass is then placed over the pot without allowance for ventilation and the experiment placed in a sheltered position in about half or filtered sunlight. It is advisable, but by no means essential, to use cold boiled water to wet the soil and fill the outer container, to reduce infestation by algae as tap water has a relatively high content of this lowly plant. The water level of the outer pot must be checked as it is lessened by evaporation.

If the seed is viable the percentage of germination will be very high, and seed sown very heavily will look like a covering of moss and be difficult to transplant. Plants can be pricked out when one inch high.

Although many *Callistemons*, *Melaleucas* and *Leptospermums* grow under dry condition, all of the many species propagated have responded to this bog-plant technique. The seedling plants grow under septic and highly humid conditions and do not damp off. This makes the writer suspect the presence of an antibiotic or perhaps the relative humidity is being controlled within favourable values.

Better results have been had with rich bush soil rather than with vermiculite and chemical nutrients, although results with this media are satisfactory if a loose soil is not available.

EDITOR'S NOTE: Mr. Boyd's experience in this, and many other methods of germination of seed, is considerable. He will only publish his findings after he has exhausted all known methods and experimented with innumerable variations of his own. I have found this method is very simple and practically 100 per cent. germination is assured. Readers are urged to try it, observe the assured results and report their experiences. No special equipment or glass-house is required. Try it on the inside ledge of a window sill behind a light curtain, or on a box partially sheltered from the sun by a bush or tree. Let us see if we can extend the list of genera which respond well to this technique. Mr. Boyd has had good results with *Eucalyptus camaldulensis*, a tree growing along the banks of rivers in the far west of N.S.W. This is a simple research project every reader can join.

TWO NEW BOTTLE BRUSHES FOR THE GARDEN

By H. W. CAULFIELD, *Curator, Brisbane Botanic Gardens*

The genus *Callistemon* has provided many excellent garden shrubs and trees. However, despite the virtues of attractive flower form and the free blooming habit of the majority, along with the added attraction of encouraging nectar-seeking bird life into the garden, they can generally be regarded as being of harsh or scraggy appearance when not in bloom. However, in recent years two new species have come under notice and promise to brighten up our garden landscape. Each is distinctly different and they lack many of the failings associated with other species already established as accepted garden subjects.

One is *Callistemon montanus* C. T. White ex S. T. Blake, the description of which was published by Dr. Blake of the Brisbane Herbarium in the Proceedings of the Royal Society of Queensland Vol. LXIX, No. 7, 1958. This plant is recorded as growing naturally about the cliff edges of sections of the McPherson Range in Southern Queensland and Northern New South Wales. *C. montanus* can be classed as a shrub or perhaps a small tree of dense growth habit. The small leaves, which are at maximum 2 inches by ¼ inch, are close and clothe the full length of the stems. New foliage is at first of a light reddish brown to pink then bright green, eventually changing in maturity to a dull mid-green. The inflorescence when compared with *C. speciosus* could be regarded as short; 3 inches appears to be the maximum length. However, many of the brushes are much shorter, the stamens are dark red with large deep yellow anthers, width of the brushes is from 2-2½ inches.

The plants growing in the Brisbane Botanic Gardens were raised from seed received from Dr. Blake in 1957. Growth rate of our plants cannot be classed as fast, as having been planted out in the Australian section for 3½ years the tallest bush is now only a little over 3 feet high. This slow growth rate may be due to local conditions as plants are sited along an exceptionally well-drained high river bank and have to withstand the competition of close-planted mature Bunya Bunya Pines. (Reports are to hand which indicate that it will move along at a faster rate.)

Due to permanent restrictions on the use of sprinklers in Brisbane, plants in the Botanic Gardens can only be watered during their early establishment period. Once established they are at the mercy of nature, however do receive some assistance from heavy mulchings of wood shavings and occasional dressings of superphosphate and sulphate of ammonia.

Callistemon montanus has a definite future as a cultivated shrub and ere long this bushy free-blooming bottlebrush will be a much sought-after item in the floricultural world.

The other bottlebrush with a difference is *Callistemon formosus* S. T. Blake which was described in the same publication as *C. montanus*. This plant is a delightful free-flowering small tree with decidedly weeping branches. In some respects it resembles *C. salignus*, however it must be regarded as a superior subject. It varies from *salignus* in that the bark is not papery and the branches more weeping. The length of the flower spikes average 3 inches and are a rich cream-white with tightly bundled stamens. Young foliage is decidedly ruddy and renders the tree most attractive when not in flower. Mature foliage is between 2 and 3 inches long and ¼ inch wide of a light to mid green colour with obvious dotting.

Three (3) plants are well established in the Brisbane Gardens. These were raised from seed collected from the type specimen; all are six years

THE GENUS PROSTANTHERA (Part 2)

By G. W. ALTHOFER

Another species of mint bush of comparatively recent discovery is *Prostanthera suborbicularis*, now known to be much more widely distributed throughout the inland regions of Queensland than was at first supposed. This species is found in country bordering on the Carnarvon Range near Morven, westward to the Grey Range and south to the N.S.W. border. It has recently been found by A. Lindner on Mt. Kaputar in the Nandewar Ranges in N.S.W.

This child of the dry uplands of the far inland of Queensland is a handsome shrub of 5 to 6 feet with hoary white stems and leaves, and large cream flowers with the same violet striation of the corolla which is such a feature of *Prostanthera striatiflora*, another plant of the dry inland. Growing on cement-like soil, this lovely plant was first seen in conjunction with *Eremophila latrobei* (of the crimson bells) and the bewildering variety of shades of *Dodonaea adenophora*, and the huge chinese-lantern fruited *D. petiolaris*. On the gentle hill slopes these species grew in profusion. Years before the country had been timbered by *Acacia aneaura*, *Eucalyptus* Spp. and *Geijera*, but long years of droughtdom had killed the bulk of these trees. When the better years came a profusion of flowering shrubs had colonised the wilderness amongst the gaunt and naked skeletons of past arboreal grandeur.

The mint bush is essentially a child of adversity, a real wildling of wildlings, and this very fact has been overlooked in the growing of our most lovely species in gardens where plants are coddled and nursed. Some species do not take kindly to this treatment, and thus has grown up the fallacious theory that the mint bush is a touchy thing and that it is short lived. That is true only so far as our treatment of the plant is wrong. On the other hand if we give the mint bush similar treatment to that meted out by mother nature, it will be found that many species hitherto thought to be short-lived will live to comparative old age. For instance, I have seen plants of *Prostanthera ovalifolia* 12 to 14 feet high and 15 years old at Pennant Hills near Sydney, which were apparently still healthy and floriferous. The secret of this grower's success was perfect drainage, a minimum of cultivation and copious applications of leaf-mould. Couple this treatment with plenty of moisture in the summer. Although short dry periods—up to one month—will be beneficial to this species, in common with a number of others, it does best with regular waterings.

Prostanthera ovalifolia was described from the collection by Robert Brown at Shoalwater Bay Passage, Queensland, and there is some doubt whether the cultivated plant really belongs to that species. However, in the absence of a definitely correct name for the cultivated plant, we are still using the well-known *P. ovalifolia* for it. I would be very much surprised if the garden specimens of today agree with the type form originally described, after 100 years of garden culture and selection. Quite apart from this respect there are many forms in N.S.W. and Queensland loosely grouped under this name, some probably deserving at least varietal rank. Of the two commonest forms under garden culture in N.S.W., one comes very close to the form found in central-west of N.S.W. and is common around the south end of Murga Valley on Nangar Cliffs. The second form has broader, darker leaves slightly dentate.

It also grows between Grenfell and Young and here there are a bewildering number of colour forms from the palest blue, mauve and

pink to the deepest purple, violet and even rose. The same species is common on rocky outcrops between Wyalong and Griffith and probably in many places between the stations mentioned. *P. ovalifolia* has grown in popularity with the passing of the years.

(To be continued in our December issue.)

EXTRACTS FROM LETTERS GIVING READERS' EXPERIENCE WITH MINT BUSHES

Prostanthera rotundifolia and *P. nivea*—Grown in half 44 gallon drums. Flowers heavily with often some blooms in autumn. It requires protection from hot westerly sun or leaves will become greyish green instead of a healthy rich green. *P. incisa* occurs naturally in surrounding sandstone districts. *P. melissifolia* must have very good drainage.—J. L. Abel, Nowra, N.S.W.

Prostanthera ovalifolia, a form growing locally, and a purchased one both stood up to the summer heat very well. I have seen the local form in purple, mauve, pink and white, some up to 12 feet high. *P. nivea* and *P. rotundifolia* stand up to the heat provided they receive water regularly.—A. Mitchell, Wyalong, N.S.W., light sandy loam for 2ft. then clayish subsoil.

Mint bush will not grow here in black soil.—G. Foster, Bowenville, Queensland. The correspondent in West Australia was unable to find anybody who has had experience with mint bushes in that state.

From Melbourne and Sydney came a long list of species which do well but without further details.

P. nivea is particularly hardy in sandy soil with only natural rainfall. *P. sieberi* is a very hardy but formed bush giving good flowering in even moderately heavy soils if protected from wind, open to the sun, and with reasonable watering.—Editor.

FROM THE EDITOR:

The strenuous efforts of the Publishing Section are being repaid by the gradual increase in the standard of production and I appreciate the patience shown with such details as drilling and dispatching. We hope that readers will show further appreciation for their journal by writing, giving their experiences, opinions and advice. Every letter received helps or encourages us.

It gives me considerable pleasure also to thank our valiant founder, Mr. A. J. Swaby, for his unstinted and vital assistance. He is at all times anxious to assist and spur on, as he calls them, the "doers". Our native plants when grown to perfection are amongst the finest in the world, but the world, and we who live amongst them, know so little of their growing habits. Every reader can help to rectify this. Study sections are forming to grow species of *Telopea*, *Acacia*, *Prostanthera*, *Verticordia*, *Eriostemon* and *Orchideae*, and beginners may grow these species to perfection in their gardens under the expert guidance of the study sections leaders. For others who prefer to do some research work independently, I commend to you the excellent article, "How To Balance The Diet," by Mr. A. J. Swaby in the May edition of "Your Garden". Try artificial feeding of some plants, as instructed and observe and report results.

"Your Garden", the monthly magazine for the home gardener that has done so much for our Society, also has the following very interesting articles in the May edition. "Wise Words On The Waratah", featuring a colour photograph of *Telopea mongaensis*. "A Pouch Of Paws", giving details of all the Western Australian Kangaroo Paws, and how you can grow them, a most interesting article.

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Some *Callistemon* Species Grown in Adelaide

By I. HOLLIDAY

Callistemons or bottle brushes come into that hardy group of shrubs which can be expected to succeed in almost any soil or situation. They respond to fertilizers, but this is by no means essential. It is important to cut back beyond the flowers each year once the bush has attained the size desired, as this treatment ensures prolific flowering and eliminates the woody look which is common to many unpruned *Callistemons*.

A number of the larger shrub varieties make lovely small trees eventually, if the lower branches are trimmed and the top left to fan out. This is particularly so where a specimen is crowded and is forced to grow taller and more slender.

The Adelaide Botanic Garden has a very beautiful specimen of *C. acuminatus* growing under these conditions—a truly lovely slender tree with rich carmine pink pendulous brushes in profusion and rich green foliage. One wonders why this particular *Callistemon* is not seen more often in our gardens.

There are four species of *Callistemons* which grow naturally in South Australia. *C. salignus*, which grows along the Torrens Gorge near Adelaide, *C. brachyandrus* from the Murray Mallee, *C. rugulosus* (syn. *coccinea*, syn. *macropunctatus*) which is found in low lying swampy country, usually sandy, and *C. teretifolius* from the dry north of the State.

All of these have been successfully cultivated in Adelaide gardens, although the plants of *C. salignus* would probably not have originated from the local form of this species.

C. salignus makes an attractive tree to 20ft. high with cream flowers and very beautiful bright pink new growing tips.

C. brachyandrus has quite small brushes, red dusted with gold, and forms a medium shrub with prickly foliage.

C. rugulosus is also a medium to large shrub with prickly foliage but delightful large red brushes (sometimes carmine) tipped with gold.

C. teretifolius in the Flinders Ranges grows to only about 3ft. high, somewhat prostrate, but in Adelaide will make a smallish shrub to 6 or 7ft. high. The red flowers are numerous and attractive.

The two Western Australian *Callistemons*, *C. speciosus* and *C. speciosus* var. *phoenicium* or *C. phoenicium* as it is usually called, are also well known in Adelaide. Both have forms which undoubtedly possess the brightest red flowers of any of the species. The fiery red of some plants of *C. phoenicium* is breathtaking when viewed from a short distance away.

The well-known *C. citrinus* (or *lanceolatus*) from New South Wales is a commonly grown shrub, although many of the garden specimens now in existence are variants with *C. citrinus* probably a parent.

C. viminalis, the weeping bottle brush, makes a very ornamental small tree in Adelaide, quite successful in heavy clay or even beach sand. This species could be used more as a street tree.

Finally there is another *Callistemon* originating in South Australia which has attracted a great deal of attention. This is the so-called *C. "Harkness Hybrid"* or *"Gawler Hybrid"*. This bottle brush first occurred at Gawler, S.A., in a local garden. To date it has proved sterile, all plants having been propagated by cuttings and hence true to label.

This plant in bloom is a treat for any garden lover. The brushes are extremely long (up to 10"), bright red in colour, and prolific. Often clusters of 10 to 12 brushes will emanate from the one point. Added to this is the

soft weeping habit when in bloom, with the new growth (greenish bronze in colour) protruding from the ends of the flowers. It is this feature which makes the whole bush in flower look so striking.

After blooming and making its new growth the bush attains a more stiff habit, similar to many others of the genus.

Some specimens at Gawler are 15 feet or more high and with correct pruning would make a good street tree. This hybrid has proved extremely hardy and very successful when grown on heavy soil overlying limestone.

TWO NEW BOTTLE BRUSHES— continued from Page 4

old and have been sited in different areas of the gardens. The plant in the much drier Australian Section has furnished well, is shorter, and as yet has not flowered. Another plant situated in the Curator's private garden has flowered but is somewhat spindly in growth due to a shady environment.

Callistemon formosus is aptly named, *formosus* "meaning" beautiful. This plant has much to offer the cultivator, firstly its delightful weeping habit with the accompanying pendulous flowers which are borne in abundance, and invariably over two distinct flowering periods, while ever-present are the beautiful pink to red tips of new growth. With such natural attributes *C. formosus* is much more than a collector's plant. The natural distribution of this plant is in the Burnett district of Southern Queensland around Biggenden and Kingaroy.

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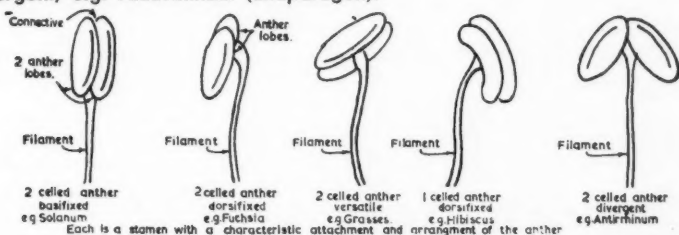
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THE FLOWER . . . PART 2

By HELEN PURNELL

The parts of a flower are arranged in several series or whorls on a structure known as the receptacle which is at the end of a floral branch. In a typical flower there are four main kinds of floral parts, namely, sepals, petals, stamens and carpels. These various parts are shown on the sketch of a Hibiscus flower on Page 12. This article deals with the whorl or whorls of stamens known as the androecium, which is made up of one or more stamens. In some plants there is only one stamen, e.g., *Euphorbia pepus* (Petty Spurge), in others the number is very large, e.g. *Hibiscus* and *Ranunculus* (Buttercup). More commonly the number is between three and ten. The stamens are arranged on the receptacle either spirally, e.g., *Ranunculus*, or in one or two whorls. In many flowers the stamens are not inserted on the receptacle but are joined directly to the corolla or perianth. Stamens inserted on the petals are said to be epipetalous, e.g. *Epacridaceae* (*Epacris*, *Leucopogon*, etc.).

A typical stamen has a stalk (the filament), carrying an anther which produces the pollen. The anther is composed of two lobes, separated by a tissue called the connective which is a continuation of the filament. Each anther-lobe usually consists of two pollen-sacs, but the septum between them normally breaks down before the pollen is shed. Sometimes the mature anther has only one lobe and is then said to be one-celled, e.g., *Malvaceae* (*Hibiscus*, *Abutilon*, etc.). When the filament is attached near the base of the anther-lobes the anther is said to be basifixed, e.g. *Solanum*, and if it is attached at the back of the anther it is dorsifixed, e.g., *Fuchsia*. A dorsifixed anther which moves freely on the end of the filament is known as versatile, e.g. the anthers of grasses. Sometimes the lobes of a dorsifixed anther may not be parallel to each other but diverge at base. Such anthers are called divergent, e.g. *Antirrhinum* (Snapdragon).



At maturity the anthers split open (dehiscence) to release the pollen. If the lobes open on the side of the anther facing outwards (i.e. towards the petals), the dehiscence is known as extrorse and when the split occurs on the side facing inwards, the dehiscence is known as introrse. When the line of dehiscence is parallel to the connective, the dehiscence is known as longitudinal, e.g., *Epacris*; and when at right angles to the connective, along the top of the anther-lobes it is said to be transverse, e.g. *Hibiscus*. Or the pollen may be shed through pores at the apices of the anther-lobes, e.g. *Rhododendron* and *Gaultheria*. In *Tetratheca* there is a single apical pore. Sometimes the anthers open by means of little valves, e.g. *Atherosperma moschatum* (Black Sassafras).

There is considerable variation in stamen length among the flowering plants, e.g. the stamens of some grasses have exceedingly long filaments while in other flowers the stamen may be very much reduced. In *Epacris* (Heath) e.g., the epipetalous stamens have only a very short filament and



Longitudinal dehiscence
e.g. *Euphorbia*.



Transverse dehiscence
e.g. *Hibiscus*.



2 pores
e.g. *Rhododendron*



1 pore
e.g. *Tetratheca*



Dehiscence by valves.
e.g. *Sassafras*.

Dehiscence by pores.

in *Grevillea*, the anthers appear to be inserted directly on the perianth. In some flowers the stamens are of unequal length. The four stamens of *Prostanthera*, e.g., are arranged in two pairs, one pair longer than the other.



Didynamous stamens
e.g. *Prostanthera*.



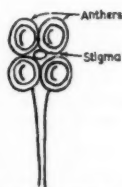
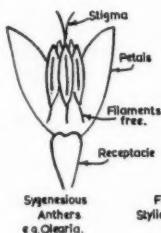
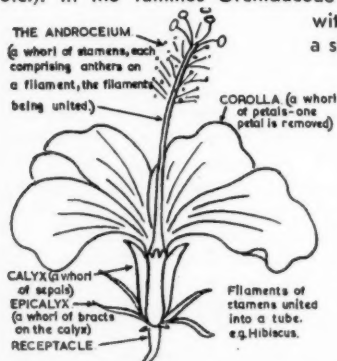
Tetradynamous stamens
e.g. *Cruciferae*

Such stamens are known as didynamous. Most members of the family *Cruciferae* (*Sisymbrium*, *Capsella*, etc.) have tetradynamous stamens, i.e., two stamens are shorter than the other four.

Sometimes the anther is reduced to a knob or flap of tissue, and is no longer pollen-producing. Such modified stamens are known as staminodes. In the flowers of *Pentstemon* e.g., there are four fertile stamens and one staminode. In some *Eucalyptus* spp. some of the stamens are reduced to staminodes and there is a staminode in the flower of *Conospermum* (Smoke Bush). Two of the other stamens of *Conospermum* are also reduced as one anther-lobe of each is sterile. The fourth stamen in the flower has two normal anther-lobes.

The filaments of the stamens are sometimes united. They are united to form a tube in the *Malvaceae* (*Hibiscus*, *Abutilon*, etc.) and in some of the *Leguminosae* e.g. *Cytisus*. In some other legumes the tube is split down one side e.g. *Goodia* and the clovers. The filaments may also be united into several groups, e.g. *Tristania* and *Melaleuca*.

Stamens may also be united by their anthers. This condition is known as syngenesious and is usual in the family *Compositae* (*Helichrysum*, *Olearia*, etc.). In the families *Orchidaceae* and *Stylidiaceae* the stamens are united with the style (part of the gynoecium) to form a structure known as the column.



Stamens occasionally bear appendages which are useful for the identification of genera or species. In the tribe *Inuleae*, family *Compositae*, the

Verticordia in S.A.

By K. J. STUCKEY

The property is situated about 20 miles from the sea, in what is known as "Geologically Recent" country, i.e., it has only emerged from the sea a couple of million years or so ago. The garden is situated on a low sandy bank, the sand overlying sandstone and some limestone. The original vegetation consisted of stringy-bark (*E. obliqua*) bracken, *Epacris impressa*, *Bossiaea cinerea*, *Tetratheca ciliata*, *Acacia myrtifolia*, *A. oxycedrus*, *A. melanoxylon*, and *A. verticiliata*, *Hakea rostrata* and *H. nodosa*, *Banksia marginata*. Average rainfall 30". Soil slightly acid.

Verticordia plumosa—the old faithful—does very well, the original plant is now six years old and still healthy and vigorous.

Verticordia drummondii—has persisted for five years so far, the plants situated in more open situations do the best and will withstand long dry periods.

Verticordia wilhelmi—a species from the west coast of S.A. which I have only had for three years but appears to be perfectly at home and flowers freely from late spring into the summer. Here again the plants in the open, dry situations have done the best.

Verticordia densiflora has persisted for four years and is not particularly happy in any situation here and I have concluded the soil type is not suitable.

Verticordia acerosa did well for four years. I fell sure the reason for its death was overcrowding by taller shrubs.

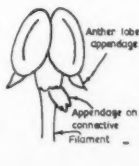
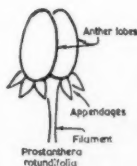
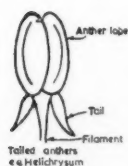
Verticordia grandiflora grew half heartedly for three years but did give the pleasure of seeing its large intense yellow flowers for that time. I feel that the soil type, especially the sub-soil, is the reason for many *Verticordias* having a short life here.

Verticordias insignis lasted for three years, last year it gave a wonderful demonstration of how a *Verticordia* can produce immense numbers of flowers and then promptly died.

Verticordia nitens was planted in an elevated position which I now know to be wrong but it grew vigorously for two years, flowered sparingly, then collapsed. *Verticordia picta*, *spicata*, *etheliana*, *browni*, and *chrysantha* only persisted for a short time and did not reach the flowering stage.

My conclusions are that most *Verticordias* like plenty of elbow-room and any nearby shrubs should be about the same height. I have several species planted in what we call the "Desert Garden", an area that receives no artificial watering whatever and these are much healthier plants than those that receive some summer watering. Last summer we had no rain for over six (6) months.

bases of the anther-lobes have thin membranous appendages, usually called



tails. The various species of *Prostanthera* can be partially separated according to the type of appendage on the anther or connective. In *Lobelia* the species can be grouped according to the form of the tuft of hairs at the apices of the anthers.

NAMING PLANTS

The only purpose of giving anything a name is in order to recognise and refer to it. For instance, if someone says Hitler, Krushchev, Churchill or Bernard Shaw, a clear picture jumps into your mind at once and you know that the name refers to a particular person with certain characteristics. In the same way, we can only conveniently refer to different plants in the garden by using names that have become associated with them, like "fern", "grass", "pine", "lily", etc.

The first names ever given were very simple and usually called attention to some peculiar shape, habit, colour, or property of the plant. So, in our British nation we have wallflower, bluebell, snowdrop, Buttercup, Chickweed, Adder's tongue—the meanings self obvious. Other people have done likewise, and in every language there are common and very old names for plants. The result is that, after thousands of years, the same plant may have a hopeless multiplicity of names; for instance, the English Oak is *Eich* in Germany, *Chêne* in France, *Balud* in Persia, while the old Latin and Greek names are *Quercus* (hence Italian *Quercia*) and *Drus* respectively. The need for standardization thus becomes apparent—there must be a universal language for referring to plants in all countries.

By common consent, Latin has come to be recognized as the language of botany—probably because writers on plant life throughout the centuries (whether English, French, German, Scandinavian or Russian) have used this classic tongue as the medium of expression.

The actual Roman names for plants, e.g. *Ulmus* for elm, *Quercus* for oak, *Fagus* for beech, have been retained, many Greek names have been latinized, and names for new plants (unknown to the Romans) have been coined from Greek or Latin roots, for the most part. The Romans (and Greeks) had native epithets for most of the familiar plants that they saw around them. As their scientific studies of living things extended, they recognised certain differences among the plants called *Fagus* (beech), *Plantago* (plantain), *Sambucus* (elderberry) etc., and an adjective was used to distinguish between the forms, e.g. there was *Plantago major*, the "big plantain", and *Sambucus niora*, the "black-fruited elder". Later still, it was discovered that there were indeed several different black-fruited elders and, by way of differentiation, the common kind was at last referred to as *Sambucus caule arboreo ramoso floribus umbellatis* ("the elder with a tree-like branching trunk and with flowers in umbels").

Continued in Vol. 1, Issue No. 4

WILD FLOWERS OF WESTERN AUSTRALIA

By C. A. GARDNER

This is a beautiful book of exceptional value. Western Australia is renowned throughout the world for its wealth of wildflowers not only for their splendour of colour and diversity of tint and shade, but for their variety in type and form. The book, so accurately but clearly written by Mr. C. A. Gardner, Government Botanist of Western Australia, so beautifully illustrated by 179 full colour photographs of the highest quality, and so well published and presented by West Australia Newspapers Ltd., does full justice to this floral beauty and wonder.

It is intended to be a popular work on its subject. Necessarily it includes some botanical references and terms, but these have been limited to essentials and need not deter the average person interested in wildflowers. A glossary of sufficient scope is provided to enable a reader to take a more specialised interest and diagrams are appended.

The book succeeds an earlier publication, which was first published in 1935, and during the ensuing 20 years eight editions were exhausted. It includes 131 new colour plates, and copious notes have been added dealing with each family of flowers illustrated. The place and time of flowering of many species are provided, and a map is included which shows almost all the place names mentioned. This is not just a new edition of the previous publication, but a new book of special value to those readers fortunate enough to have a copy of the older publication, and to all people interested in lovely flowers and beautiful books.

Available only from West Australia Newspapers Ltd., Perth, West Australia.

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Colour Slide from N. B. Thomson

A scene between Newdigate and Lake Grace, West Australia, showing three varieties of *Verticordia*. They are *Verticordia roei* (white), *V. picta* (pink) and *V. chrysantha* (orange-yellow).

It would seem from the angle of growth of trees on the horizon that the *Verticordias* are in reality on a gentle slope, as is more usually the case. There is also the possibility that in this latitude (some 350 miles south of where I examined *V. picta*) exposed soils are not heated to the extent that they are further north. The mean relative humidity near Newdigate would almost certainly be lower than near Geraldton, which alone would favour their growth.

The transparency also illustrates very well a notable feature of the sandplain flora, namely the extraordinary diversity of species, even within a single genus, which are present in a very small area. In other areas quite close at hand where a different soil has been exposed, it would be common to find yet another, and totally different, plant association. (Comment by W. N. B. Quick.)

The definition on this print is not perfect, but it was printed to give readers not fortunate enough to have been to W.A., an idea of the country discussed. Will readers in these areas report further.—Editor.

SOME OBSERVATIONS ON THE GENUS *VERTICORDIA*

By W. N. B. QUICK

Many species of the genus *Verticordia* have acquired a reputation for being difficult or near impossible of cultivation. As plants of the sandplains, we provided for perfect drainage and full sun, but received little encouragement from the results achieved. More recently a suggestion was made that the plants may require substantial amounts of lime (l) at their lower root-levels, but experiment along these lines has, in a number of cases, proved costly.

With a view to making a brief study of some of these plants in their natural environment, a trip to the south west province of Western Australia was organised for the August-September period of 1958.

Although we had been told that these are plants of the sandplains, two points soon became apparent: First, that the term "sandplain," as commonly employed in the west, is a very general term applied to any area covered by a film of sand, quite regardless of its depth or of the immediate sub-strata. In small areas the sand cover may be completely absent, exposing materials as diverse as laterite (massive, nodular, or pisolitic), granite, various clays, and kaolin. Secondly, *Verticordias* are certainly not limited to the sandplains.

One particularly frequent soil profile in areas of great floral wealth consists of a layer of very light-textured pale yellow-grey sand 8in. to 18in.

deep, underlaid by a layer of nodular laterite of comparable depth, beneath which again there is clay—variable in colour and sand content, and often with extensive patches or pockets of kaolin, or white to yellow kaolinitic clay (2).

However, as has been stated, *Verticordias* are not limited to these soils, and details of soils and aspects for five species are given below.

Verticordia picta

Growing, together with several unidentified species, on the slopes of of small sandy rises 15 miles north of Geraldton. Soil as in (2). Topsoil and subsoil acid in reaction, free of accumulation of calcium salts. Aspect to the east or south-east, but the gradient of the slopes is not pronounced, and would not exceed 3 or 4 per centum.

Verticordia chrysanthia* var. *preissii

Near the base of sandy hillocks some 8 miles east of New Norcia. Soil as above. Aspect to the north, but some shade and shelter provided by various Eucalypts. (Associated species, for the record, included *Eucalyptus gardneri* (?), *E. macrocarpa*, *Dryandra polycephala*, and several of the smaller *Sterculiaceae*).

Verticordia grandis

On the undulating sandplain some 20 miles west of Three Springs and similar soils elsewhere. Soil type as in the previous two species. Although not on steep slopes, (approx. gradient 4 per cent.) aspect is generally to the south or south-east. Some water would appear to flow over the surface in periods of heavy rain. Associated species include *Macropidia fuliginosa*, *Hakea baxteri*, *H. corymbosa*, *H. conchifolia*, *H. auriculata*, *Calectasia syanea*, *Eriostemon brucei* and *Geleznowia calycina*.

Verticordia acerosa

Southern slopes of a low ridge 5 miles north of Geraldton where areas of a fine-textured heavy chocolate-coloured clay have been exposed. Very hard when dry, and subject to extensive cracking. Sand cover very superficial or absent. Seed germinates freely on the surface when wet.

Verticordia plumosa

On the south and east slopes of Mt. Clarence, Albany, in moist pockets and fissures in the granite rocks. Soil black, fine-textured, and acid in reaction. While it is often shallow, it is extremely rich in organic matter and almost perpetually cool and moist. This species occurs in a number of forms from Esperance to west of Moora, in isolated pockets which are continually moist. Associated species on Mt. Clarence include *Callistemon phoeniceus*, *Hovea elliptica*, *Hakea suaveolens*, *Dryandra formosa*, *Boronia crenulata*, and (formerly) *Banksia coccinea*.

Although in none of the above cases was any accumulation of calcium salts present within reach of the roots, two factors are however common to five localities given, and may prove of some significance:

- (i) All five areas are subject to appreciable amounts of sea-salt being deposited by gravitation and rainfall, after having been carried inland by the prevailing winds. Plants in these areas are able to absorb relatively huge amounts of sodium and potassium salts, as is indicated in a simple flame-test of their ashes by the intense and persistent sodium and potassium flames; and also by the large amounts of saline material leached from the soil when land in these areas is ruthlessly stripped for agricultural purposes.
- (ii) In no case is the root-run, or soil around the root area, exposed to the direct or day-long heat of the sun's rays. Possibly such situations do, in certain areas, carry these plants, but the very nature of the light, sandy, open-textured soil in many areas, and the structure of the "B" horizon,

would provide a very substantial insulation against heat, sudden temperature change, and loss of moisture.

When notes for this paper were originally prepared, it was felt that careful attention to the following points would greatly assist in the successful cultivation of these beautiful plants:

- (i) Adequate drainage.
- (ii) Occasional application of small doses of the mixed chlorides of sodium and potassium—say $\frac{1}{4}$ oz. to the square yard each season.
- (iii) Provision of shelter from the worst of the summer sun.
- (iv) Selection of species suited to the type of soil available, within fairly wide limits. (Experiment has shown that *V. acerosa* is easily grown in sand to which has been added 10 per cent. of powdered clay, while it will not grow in sand alone.)

Subsequent garden trials on this basis have given generally very satisfactory results, but it seems desirable to mention one or two points of interest, viz.:

- (i) The addition of the sodium and potassium salts does not appear to be of any importance, although no ill-effects were produced.
- (ii) A number of species—in particular *V. grandis* and its closer relatives—appear to be quite intolerant of any excessively humid conditions.

Generally speaking, most species come from low-rainfall areas and well-drained soils, with the result that in spite of various xermorphic modifications of the leaves, the demand for moisture from their small root-systems is more or less constant and heavy. If this demand is reduced severely, by too-heavy pruning, pruning during the wet season, or by humidity reducing the rate of transpiration, soil in the immediate vicinity of the root-system becomes over-charged with moisture to the exclusion of oxygen. If the soil is appreciably warm when this happens, trouble in the form of root-rot will be encountered, and almost invariably proves fatal. We obviously cannot prevent the soil in the higher-rainfall areas from becoming appreciably damp at times, nor can we control the humidity effectively, and the only effective approach is to create conditions unfavourable to the organisms causing root-rot—several species of both fungi and bacteria.

This is possible, at least to an extent, by putting a little care and thought into planting, which, if carried out as recommended, will not only prove successful, but will assume a pleasing and natural appearance. Plantings should be confined to areas immediately beneath, or to the south or south-east of some substantial tree. Here, the roots of the larger plant will readily absorb any excess moisture present and keep the soil well aerated, while the crown of the tree will provide shade for the hottest part of the day in summer. The position should be sufficiently open to allow the lower winter sun to reach under the crown of the tree. Below and between trees the air will circulate freely, and humidity will be kept to a minimum, but avoid planting among dense, low-branched shrubs as far as possible.

These recommendations apply of course only to areas where neither soil nor aspect resemble those to which the sandplain species are accustomed. In Victoria, several areas as far south as Melbourne should prove quite satisfactory without any special planning or preparation. Little trouble should be experienced with species from the south, such as *V. plumosa*, which will flourish for many years and flower freely in almost complete shade or part sun in a wide variety of soils.

PROPAGATION:

(A) From Seed. Sow under glass during August, or in open semi-shade in late September (Melbourne). Good results have been obtained with light

coastal bush sand, with or without the addition of 20 per cent. peat moss. Rub all through a $\frac{1}{8}$ " mesh sieve. Tip into a well-drained seed-box, levelling the surface with a stick to avoid tamping down. Place the seed on a flat surface and stir about with a lighted taper of newspaper until the majority of the seeds have been lightly scorched. Sow fairly thickly on the prepared surface. Sprinkle with just sufficient dry sand to anchor the seed—don't cover it. It is quite immaterial which way up the seeds lie, and the addition of a salt to the water used has proved of no benefit. Waterings with a fine mist are carried out at intervals to prevent total drying out of the surface. Seedlings may appear after 2 to 4 weeks and continue coming through for many months. Prick out into individual containers, using the same soil and adequate drainage material, as soon as the seedlings are large enough to handle. Ungerminated seed may be sifted from the soil and re-sown. It is inadvisable to sow seed of *V. grandis* or related species under glass. Wait another month and sow in the open.

(B) Vegetative. Most species are readily propagated from well-ripened lateral shoots of either juvenile or mature foliage, preferably with a small



Photograph by W. N. B. Quick
Verticordia plumosa. A small shrub from the peaty granitic soils of the moister areas of s.th.-west W.A., and probably the first of the genus to be cultivated.

heel. (Note: Some species may show only one foliage form, while others have a third inflorescence foliage which has not given good results. Typical of these latter is *V. brownii*, with broad corymbose heads). Lateral shoots from 1" to 3" long, from which the lower foliage has been cleanly removed, are inserted to half their length in the propagating medium best suited to the frame or glass house employed. In the case of such species as *V. nitens*, where decorticating bark is retained as a loose sleeve, making preparation of the material almost impossible, younger shoots may be used to advantage. Although it is preferable to set the

cuttings in spring or autumn, some success may be expected in Melbourne at most times of the year, and cuttings of *Verticordias* are seldom refused on the grounds that it is the wrong time of the year.

- (1) This suggestion was made as a result of the kaolin present in some areas having been mistaken, in the absence of chemical test, for limestone.
- (2) Lat. ite podzolic soils. Ref.: "A Manual of Australian Soils" by C. G. Stephens (C.S.I.R.O.), 2nd Edit., 1956.

